(a) dispensing a first monomer in a droplet of 5 nl or less onto the surface of the support at the one or more localized areas wherein the one or more localized areas are smaller than 1 cm^2;

(b) allowing the first monomer to attach directly or indirectly to the surface of the support at the one or more localized areas;

(c) repeatedly dispensing an additional group of added monomers in droplets of 5 nl or less onto the surface of the support at the one or more localized areas in a manner to couple with a compound at the one or more localized areas until an array of at least 10 different polymers at different localized areas is formed.

49. The method of claim 48 wherein the monomer is dissolved in solution.

50. The method of claim 48 wherein the monomer is in the form of a pellet.

51. The method of claim 48 wherein the support further comprises a cover plate.

52. The method of claim 48 wherein the step of dispensing includes a dispenser positioned between about 5 microns and about 50 microns away from the support.

53. The method of claim 48 wherein the step of dispensing includes a dispenser positioned about 10 microns away from the support.

54. The method of claim 48 wherein the droplet fits within a region having a diameter of less than about 300 microns.

55. The method of claim 48 wherein the monomer comprises a nucleotide or an amino acid.

56. The method of claim 48 wherein the polymer comprises a nucleic acid, oligonucleotide, polynucleotide, peptide, or polypeptide.

57. The method of claim 48 wherein the polymer comprises at least 2 monomers.

58. The method of claim 48 wherein the polymer comprises greater than 100 monomers.

59. The method of claim 48 wherein the polymer comprises 2, 3, 4, 5, 6, 10, 15, 20, 30, 40, 50, 75, or 100 monomers.

60. The method of claim 48 wherein the support is selected from the group consisting of substantially flat substrates, substrates having raised or depressed regions, beads, gels, sheets, particles, strands, precipitates, spheres, containers, capillaries, pads, slices, films, plates, and slides.

61. The method of claim 48 wherein the support comprises a gel.

62. The method of claim 48 wherein the support comprises biological materials, nonbiological materials, organic materials or inorganic materials.

63. The method of claim 48 wherein the support is a disc, square, or circle.

64. The method of claim 48 wherein the one or more localized areas are smaller than $1 mm^2$.

65. The method of claim 48 wherein the one or more localized areas are smaller than $0.5 mm^2$.

66. The method of claim 48 wherein the one or more localized areas are smaller than 10,000 μm^2.

67. The method of claim 48 wherein the one or more localized areas are smaller than 100 μm^2.

68. The method of claim 48 wherein an array of at least 100 different polymers at different localized areas is formed.

69. The method of claim 48 wherein an array of at least 1000 different polymers at different localized areas is formed.

70. The method of claim 48 wherein an array of at least 10,000 different polymers at different localized areas is formed.

71. The method of claim 48 wherein an array of at least 100,000 different polymers at different localized areas is formed.

72. The method of claim 48 wherein an array of at least 1,000,000 different polymers at different localized areas is formed.

73. The method of claim 48, wherein an array of at least 1000 different polymers occupying localized areas within 1 cm^2 of the surface of the support.

74. The method of claim 48, wherein the support comprises glass, derivatized glass, pyrex, quartz, a polymeric material, polystyrene, polycarbonate, silicon or a gel.

75. The method of claim 49, wherein the solution comprises an aqueous solution.

76. The method of claim 48 wherein the step of dispensing includes a dispenser comprising a plurality of dispensing units, wherein the plurality of dispensing units is in fluid communication with a solution comprising a monomer and wherein steps (a) and (c) comprise dispensing a droplet of 5 nl or less from one or more of the plurality of dispensing units.

77. The method of claim 48, wherein the support bears at least two reference points for positioning the dispenser over at least one of said localized areas for dispensing of the droplet.

78. The method of claim 77, wherein the reference points comprise global reference points for positioning the dispenser over a local region of the surface of the support, and local

reference points within the local region for positioning the dispenser over a localized area within the local region.

79. The method of claim 77, wherein the dispenser further comprises a camera for identifying the reference points.

80. The method of claim 77 further comprising the step of sensing changes in capacitance to identify the reference points.

81. The method of claim 77 further comprising the step of sensing changes in light intensity to identify the reference points.

82. The method of claim 77 further comprising the step of sensing changes in resistivity to identify the reference points.

83. The method of claim 77 further comprising the step of sensing changes in optical properties to identify the reference points.

84. The method of claim 77 further comprising the step of sensing changes in magnetic properties to identify the reference points.

85. The method of claim 76 wherein the plurality of dispensing units comprises a manifold of delivery lines.

86. The method of claim 76 wherein the plurality of dispensing units comprises an array of pipettes.

87. The method of claim 76 wherein the plurality of dispensing units comprises a series of tubes.

88. The method of claim 76 wherein the plurality of dispensing units includes control valves.

89. The method of claim 48 wherein the monomer is bound indirectly to the surface of the support via a linker molecule.

90. The method of claim 48 wherein the step of dispensing includes a dispenser that is moved relative to the support.

91. The method of claim 48 wherein the support is moved relative to a dispenser.

92. The method of claim 48 wherein the one or more localized areas are spaced less than about 3 mm apart.

93. The method of claim 48 wherein the one or more localized areas are spaced less than between about 5 microns and 100 microns apart.

94. The method of claim 48 wherein the one or more localized areas has an angular relation between each localized area of about 1 degree.

95. The method of claim 48 wherein the one or more localized areas has an angular relation between each localized area of about 0.1 degree.

96. The method of claim 48 wherein the support comprises at least about 100 localized areas.

97. The method of claim 48 wherein the support comprises at least about 1000 localized areas.

98. The method of claim 48 wherein the support comprises at least about 10,000 localized areas.

99. The method of claim 48 wherein the support comprises at least about 1000 localized areas per cm^2 of surface of substrate.

100. The method of claim 48 wherein the support comprises at least about 10,000 localized areas per cm^2 of surface of substrate.

101. The method of claim 48 wherein the support comprises a strand including one or more of glass, derivatized glass, quartz, or a polymeric material.

102. The method of claim 48 wherein the step of dispensing includes a dispenser comprising a dispenser tip and a sheath encircling the dispenser tip and rigidly extending a fixed distance beyond the dispenser tip.

103. The method of claim 48 wherein the surface of the support comprises a hydrophilic substance.

104. The method of claim 48 wherein the surface of the support comprises a hydrophobic substance.

105. The method of claim 48 wherein the surface of the support comprises a hydrophilic substance and a hydrophobic substance.

106. The method of claim 48 wherein the surface of the support comprises a hydrophilic group.

107. The method of claim 48 wherein the surface of the support comprises a hydrophobic group.

108. The method of claim 48 wherein the surface of the support comprises a hydrophilic group and a hydrophobic group.

109. The method of claim 48 wherein the surface of the support comprises a photoresist.

110. The method of claim 48 wherein the surface of the support is cleaned prior to the step of dispensing a droplet.

111. The method of claim 48 wherein the step of dispensing includes a dispenser comprising a pipette.

112. The method of claim 48 wherein the step of dispensing includes a dispenser comprising a capillary tube.

113. The method of claim 48 wherein the step of dispensing includes a dispenser comprising an electrophoretic pump.

114. The method of claim 48 wherein the step of dispensing includes a dispenser comprising an osmotic pump.

115. The method of claim 48 wherein the step of dispensing includes a dispenser comprising a cell sorter.

116. A method of forming an array of polymers on a support having one or more localized areas comprising

(a) locating a dispenser comprising a plurality of dispensing units a distance away from a surface of the support, wherein the plurality of dispensing units is in fluid communication with a solution comprising a monomer;

(b) dispensing at least one droplet of 5 nl or less from the dispenser, with the at least one droplet contacting the surface at a localized area smaller than 1 cm^2;

(c) allowing the monomer to attach directly or indirectly to the surface of the support at the localized area;

(d) repeating steps a through c to attach a same or different monomer at a same or different localized area until an array of at least 10 different polymers at different localized areas is formed.

117. The method of claim 116 wherein an array of at least 100 different polymers at different localized areas is formed.

118. The method of claim 116 wherein an array of at least 1000 different polymers at different localized areas is formed.

119. The method of claim 116 wherein an array of at least 10,000 different polymers at different localized areas is formed.

120. The method of claim 116 wherein an array of at least 100,000 different polymers at different localized areas is formed.

121. The method of claim 116 wherein an array of at least 1,000,000 different polymers at different localized areas is formed.

122. The method of claim 116 wherein the monomer is an amino acid or a nucleotide.

123. The method of claim 116 wherein the polymer is a polypeptide or a nucleic acid.

124. An automated apparatus for forming an array of polymers on a support having one or more localized areas comprising

a dispenser in fluid communication with solutions of monomers,

a positioning system capable of positioning the dispenser relative to a localized area on the support,

the dispenser adjusted to dispense droplets no greater than 5 nl and adjusted to dispense in series a number of different monomers to a localized area on the support in a manner to couple with a compound at the localized area until an array of at least 10 different polymers at different localized areas if formed.

125. The apparatus of claim 124 wherein the dispenser is positioned between about 5 microns and about 50 microns away from the support.

126. The apparatus of claim 124 wherein the dispenser is positioned about 10 microns away from the support.

127. The apparatus of claim 124 wherein the droplet fits within a region having a diameter of less than about 300 microns.

128. The apparatus of claim 124 wherein the monomer comprises a nucleotide or an amino acid.

129. The apparatus of claim 124 wherein the polymer comprises at least 2 monomers.

130. The apparatus of claim 124 wherein the polymer comprises greater than 100 monomers.

131. The apparatus of claim 124 wherein the polymer comprises 2, 3, 4, 5, 6, 10, 15, 20, 30, 40, 50, 75, or 100 monomers.

132. The apparatus of claim 124 wherein the support is selected from the group consisting of substantially flat substrates, substrates having raised or depressed regions, beads, gels, sheets, particles, strands, precipitates, spheres, containers, capillaries, pads, slices, films, plates, and slides.

133. The apparatus of claim 124 wherein the support comprises a gel.

134. The apparatus of claim 124 wherein the support comprises biological materials, nonbiological materials, organic materials or inorganic materials.

135. The apparatus of claim 124 wherein the support is a disc, square, or circle.

136. The apparatus of claim 124 wherein the one or more localized areas are smaller than $1mm^2$.

137. The apparatus of claim 124 wherein the one or more localized areas are smaller than $0.5mm^2$.

138. The apparatus of claim 124 wherein the one or more localized areas are smaller than 10,000 μm^2.

139. The apparatus of claim 124 wherein the one or more localized areas are smaller than 100 μm^2.

140. The apparatus of claim 124 wherein an array of at least 100 different polymers at different localized areas is formed.

141. The apparatus of claim 124 wherein an array of at least 1000 different polymers at different localized areas is formed.

142. The apparatus of claim 124 wherein an array of at least 10,000 different polymers at different localized areas is formed.

143. The apparatus of claim 124 wherein an array of at least 100,000 different polymers at different localized areas is formed.

144. The apparatus of claim 124 wherein an array of at least 1,000,000 different polymers at different localized areas is formed.

145. The apparatus of claim 124, wherein an array of at least 1000 different polymers occupying localized areas within 1 cm^2 of the surface of the support.

146. The apparatus of claim 124, wherein the support comprises glass, derivatized glass, pyrex, quartz, a polymeric material, polystyrene, polycarbonate, silicon or a gel.

147. The apparatus of claim 124, wherein the solution comprises an aqueous solution.

148. The apparatus of claim 124 wherein the dispenser comprises a plurality of dispensing units.

149. The apparatus of claim 124, wherein the support bears at least two reference points for positioning the dispenser over at least one of said localized areas for dispensing of the droplet.

150. The apparatus of claim 124, wherein the reference points comprise global reference points for positioning the dispenser over a local region of the surface of the support, and local reference points within the local region for positioning the dispenser over a localized area within the local region.

151. The apparatus of claim 124, wherein the dispenser further comprises a camera for identifying the reference points.

152. The apparatus of claim 148 wherein the plurality of dispensing units comprises a manifold of delivery lines.

153. The apparatus of claim 148 wherein the plurality of dispensing units comprises an array of pipettes.

154. The apparatus of claim 148 wherein the plurality of dispensing units comprises a series of tubes.

155. The apparatus of claim 148 wherein the plurality of dispensing units includes control valves.

156. The apparatus of claim 124 wherein the monomer is bound indirectly to the surface of the support via a linker molecule.

157. The apparatus of claim 124 wherein the dispenser is moveable relative to the support.

158. The apparatus of claim 124 wherein the support is moveable relative to the dispenser.

159. The apparatus of claim 124 wherein the one or more localized areas are spaced less than about 3 mm apart.

160. The apparatus of claim 124 wherein the one or more localized areas are spaced less than between about 5 microns and 100 microns apart.

161. The apparatus of claim 124 wherein the one or more localized areas has an angular relation between each localized area of about 1 degree.

B1 Cont.

162. The apparatus of claim 124 wherein the one or more localized areas has an angular relation between each localized area of about 0.1 degree.

163. The apparatus of claim 124 wherein the support comprises at least about 100 localized areas.

164. The apparatus of claim 124 wherein the support comprises at least about 1000 localized areas.

165. The apparatus of claim 124 wherein the support comprises at least about 10,000 localized areas.

166. The apparatus of claim 124 wherein the support comprises at least about 1000 localized areas per cm^2 of surface of substrate.

167. The apparatus of claim 124 wherein the support comprises at least about 10,000 localized areas per cm^2 of surface of substrate.

168. The apparatus of claim 124 wherein the support comprises a strand including one or more of glass, derivatized glass, quartz, or a polymeric material.

169. The apparatus of claim 124 wherein the dispenser comprises a dispenser tip and a sheath encircling the dispenser tip and rigidly extending a fixed distance beyond the dispenser tip.

170. The apparatus of claim 124 wherein the surface of the support comprises a hydrophilic substance.

171. The apparatus of claim 124 wherein the surface of the support comprises a hydrophobic substance.

172. The apparatus of claim 124 wherein the surface of the support comprises a hydrophilic substance and a hydrophobic substance.

173. The apparatus of claim 124 wherein the surface of the support comprises a hydrophilic group.

174. The apparatus of claim 124 wherein the surface of the support comprises a hydrophobic group.

175. The apparatus of claim 124 wherein the surface of the support comprises a hydrophilic group and a hydrophobic group.

176. The apparatus of claim 124 wherein the surface of the support comprises a photoresist.

177. The apparatus of claim 124 wherein the dispenser comprises a pipette.

178. The apparatus of claim 124 wherein the dispenser comprises a capillary tube. - -